but as I have not seen *Liochoria Huttoni*, I cannot state whether the sternal structure differs from that of the species I now locate in the same genus. These five species evidently form one natural group.

CYTILISSUS, gen. nov.

Facies resembling the setose species of *Morychus*. *Antennæ* short, first joint large, cylindric, second quite half the length of the first, narrowed apically, third elongate and slender, fourth slender, shorter than third, fifth broader, subquadrate; *club* elongate, oblong, about as long as joints 3 to 5 taken together, compact, very indistinctly articulated, but, so far as I can see, composed of two nearly equal joints.

The antennæ, therefore, seem to have but seven joints, a character which of itself is sufficient in this group for generic separation.

Cytilissus claviger, sp. n.

Convex, broadly oval or subrotundate; with numerous erect, elongate, slender, cinereous setæ or hairs; piceous, slightly shining, the tibiæ and first joint of the antennæ red, tarsi and palpi yellow.

Head finely and distantly punctured. *Eyes* distinctly faceted. *Thorax* strongly transverse, narrowed anteriorly, sides straight, base and apex truncate, its angles acute; its surface very finely but not closely punctured. *Scutellum* invisible. *Elytra* distantly and very finely punctured. *Legs* with fine setæ; anterior tibiæ grooved along the outside, the middle pair only a little curved externally. *Tarsi* moderate, the third joint with a thin well-developed membranous appendage. *Palpi* thick, obtuse at the extremity.

Underside pitchy, punctate, with pale longish hairs.

Length $1\frac{1}{8}$, breadth $\frac{3}{4}$ line.

Mount Pirongia. I regret having been unable to find more than one of this interesting species.

[To be continued.]

XXIX.—*On an Abnormal Specimen of* Antedon rosacea. By HERBERT C. CHADWICK (from the Zoological Laboratory of the Owens College).

[Plate VIII.]

THREE months ago, while selecting specimens of *Antedon rosacea* for serial section-cutting from a number which had

been forwarded to the Zoological Laboratory of the Owens College by the authorities of the Zoological Station at Naples, my attention was arrested by one to the disk of which a small rounded body was attached. A cursory examination at once showed the specimen to be one of very exceptional interest, and my thanks are due to Prof. Milnes Marshall for permission to examine and describe it.

The disk (Pl. VIII. figs. 1 and 2), which measured 7·5 millim. in diameter, bore the usual number of well-developed arms, and with the exception of the displacement of one of the ambulacral grooves, to be more fully described later on, was in all respects quite normal. On its oro-lateral border, however, it bore the body to which allusion has already been made, and which proved to be a supernumerary disk (figs. 1, 2, and 3, *s.d.*). Roughly spherical in shape and about 3 millim. in diameter, it was attached to the normal disk by a sort of stalk, which gradually narrowed from the oral to the aboral surface. Near the centre of its oral surface was a well-developed mouth, fringed with tentacles, from which five ambulacral grooves radiated, just as do those of the disk of a normal *Antedon*. Of these, four could with little difficulty be traced outwards to the aboral aspect.

The remaining one (figs. 1 and 3, *x*) ran along the stalk of attachment to the normal disk and joined the ambulacral grooves of the pair of arms nearest to it, immediately after crossing the line of junction of the two disks. On the aboral surface the anus appeared as a minute crescent-shaped aperture (figs. 2 and 4, *a*). Close to it was a minute scarcely distinguishable pore, another rather larger aperture appearing on the summit of the funnel-shaped projection, *f.p.* (figs. 2 and 5). The nature and connexion of these will appear later on.

Minute Anatomy.—Having carefully noted and drawn the external characters of the specimen, I decalcified it by immersion for twenty-four hours in a 10 per cent. solution of nitric acid, and, after staining in borax carmine, I was fortunate enough to obtain an unbroken series of sections by means of the rocking microtome. From a very careful study of these I find that the body-cavities of the two disks communicate freely with each other through the stalk or isthmus of tissue which unites them, their alimentary canals, on the other hand, being quite distinct. The alimentary canal of the supernumerary disk (figs. 3 and 4, *g'*) is well developed and contains food. The ambulacral system is also well marked and presents a feature of special interest. The minute pore close to the anus, to which I have already alluded, opens into a canal-like space (fig. 4, *c*), which traverses the body-wall for

a distance equal to the thickness of seventeen sections, and again communicates with the exterior through the funnel-shaped projection already described (figs. 2 and 5, *f.p.*). That this canal was a modified ambulacral groove is shown by the epithelial cells which line it. They are precisely similar to those which line the ordinary ambulacral grooves; and further evidence in the same direction is afforded by the presence in its walls of numbers of the deeply staining problematical bodies which are invariably seen in sections of the ambulacral grooves of this species. Beneath the epithelium of the ambulacral grooves the nerve-band can be recognized without difficulty in most sections. The circular water-vessel (fig. 5, *c.w.v.*) and radial water-vessels are also present, and from the former a considerable number of water-tubes (fig. 5, *w.t.*) depend into the body-cavity. Water-pores traverse the body-wall in all the sections and are abundant on the interambulacral area, marked with an asterisk in fig. 1 (see also fig. 3, *w.p.*). The skeletal and axial nervous systems present in the normal disk are entirely absent in the supernumerary one; so also is the central plexus.

The interesting question now arises—What was the mode of origin of the supernumerary disk? In answer to it two hypotheses may, I think, be advanced:—

1. That the supernumerary disk originated as a bud from the normal disk.

2. That it is the result of incomplete evisceration.

In favour of the former hypothesis is the intercommunication of the body-cavities of the two disks—a condition of things one would expect to find in a budding organism. Against it is the entire absence of arms, skeleton, and axial nervous system in the supernumerary disk. The comparatively large size attained by the supernumerary disk and the fact that the remaining systems of organs had attained their adult condition add importance to this objection. A still weightier objection lies in the fact that, so far as I know, the formation of a bud has never been observed in any Echinoderm.

I am indebted to Prof. Marshall for the second hypothesis, and it appears to me to explain the facts most conclusively.

Though *Antedon rosacea* has never been proved to eviscerate spontaneously, eviscerated specimens frequently occur in dredgings; and the experiments of Prof. Marshall * and Mr. Dendy † have shown that evisceration may be and often is followed by complete regeneration of the visceral mass.

* "On the Nervous System of *Antedon rosacea*," Quart. Journ. Micr. Sci. xxiv. (1884) pp. 507–548.

† "On the Regeneration of the Visceral Mass of *Antedon rosacea*,"

These facts seem to me to make more than probable the supposition that at an earlier period the specimen had suffered evisceration without the visceral mass being completely detached. By the continuity of the ambulacral grooves of two of the arms of the normal disk with one of the grooves of the supernumerary disk a supply of food would be ensured to the latter without seriously curtailing that of the former during regeneration. In the paper just cited Mr. Dendy has shown in how short a time the visceral mass may be regenerated, twenty-one days being a sufficient length of time for regeneration to become so complete that "there is little to distinguish a regenerated specimen of this date from a normal *Antedon* except the small size of the visceral mass and the want of pigment upon it."

The abnormal character and displacement of the anus and the canal-like ambulacrum are not so easily accounted for; but they are minor points, and do not appear to me to impair the value of what has been advanced above.

EXPLANATION OF PLATE VIII.

List of reference letters.

a. Anus.
a.g. Ambulacral grooves.
c. Abnormal ambulacrum.
c.w.v. Circum-oral water-vessel.
f.p. Funnel-shaped projection of supernumerary disk.
g. Gut.
g'. Gut of supernumerary disk.
m. Mouth.
r.w.v. Radial water-vessel.
s.d. Supernumerary disk.
s.o. Skeletal ossicles.
w.t. Water-tubes.
x. Ambulacral groove.

Fig. 1. Oral surface of abnormal specimen of *Antedon rosacea*, × 5.
Fig. 2. Aboral surface of abnormal specimen of *Antedon rosacea*, × 5.
Fig. 3. Sagittal section through the normal and supernumerary disks, showing the point of union of the two, × 16.
Fig. 4. Sagittal section of the supernumerary disk, passing through the mouth and anus, × 16.
Fig. 5. Sagittal section of the supernumerary disk, showing the funnel-shaped projection traversed by the abnormal ambulacrum, × 16.

XXX.—*List of the Fishes collected by Mr. E. W. Oates in the Southern Shan States, and presented by him to the British Museum.* By G. A. Boulenger.

The collection made by Mr. Oates in a district previously unexplored, so far as Fishes are concerned, proves of great interest. It adds to our knowledge of the extension of species

---

Studies from the Biological Laboratories of the Owens College, i. (1886) pp. 299–312.